

Technical University of Denmark



## EERA Joint Research Programme: Wind Energy

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*Publication date:*  
2010

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*Citation (APA):*

Madsen, P. H. (2010). EERA Joint Research Programme: Wind Energy [Sound/Visual production (digital)]. SET-Plan Conference 2010, Madrid (ES), 3-4 Jun, 01/01/2010

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# SET-Plan Conference 2010

3th-4th of june 2010, Madrid, Spain

**Spanish Presidency  
of the European Union**

## EERA Joint Research Programme “Wind Energy”

**JP Co-ordinator:**

***Peter Hauge Madsen***  
***(Risø DTU)***



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2010.es



# Introduction

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The EERA vision for the joint programme on wind energy is

- to provide the strategic leadership for the scientific–technical *medium to long term* research to support the EII and the Technology Roadmap's activities on *wind energy* and
- on basis of this, to initiate, coordinate and perform the necessary scientific research.

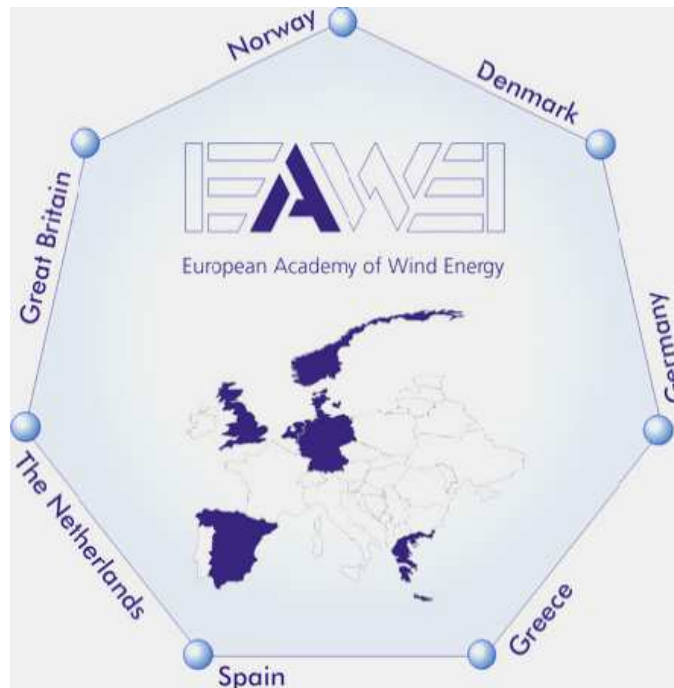
The vision calls for all the EERA participants and associates

- to align their research in wind energy topics which influence the use and deployment of wind energy and
- Perform coordinated and structured research in medium to long-term programmes with shared research facilities.



# Background

## Wind energy R&D in Europe - an area of collaboration



**EAWWE** – European Academy of Wind Energy



**UPWIND** – EU Integrated project

# Approach

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## Alignment phases:

1. An immediate joint programme is initiated with shared results from ongoing programmes. Parallel a detailed survey of the research activities in the identified fields; a gap-analysis at the EERA partners and on a global scale providing the background for the activity in next phase
2. Formulation of a detailed joint programme with a concentrated effort towards removing the barriers that prevent or impede close research cooperation.
3. Finally launch of the full joint programme.

## Basic structure:

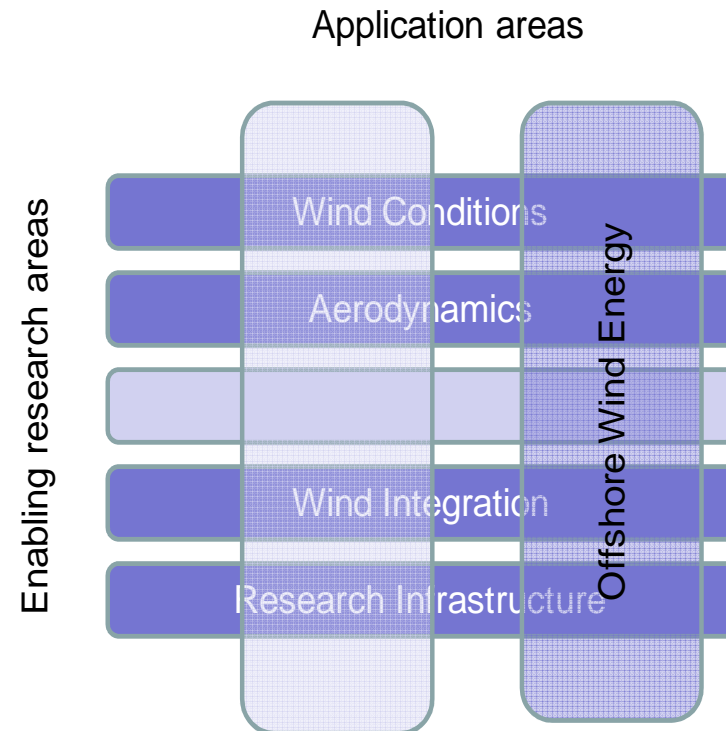
1. Theory and models,
2. data acquired from well focused experiments,
3. verification of theory and models by the data and
4. development of new generic technology concepts.

The participants have agreed on organizing themselves with shared model developments, shared databases and commonly developed schemes for verification as well as sharing research facilities.

# Structure of the Joint Programme

The joint programme comprises the following 5 sub-programmes:

- **Wind Conditions.** Coordinated by Risø DTU in Denmark.
- **Aerodynamics.** Coordinated by ECN in the Netherlands.
- **Offshore Wind Energy.** Coordinated by SINTEF in Norway.
- **Grid Integration.** Coordinated by FhG IWES in Germany.
- **Research Facilities.** Coordinated by CENER in Spain.





## Participants and resources

The Joint Programme is open to all research organizations which will commit a significant effort of the order of 3-5 man-years per year in one or more of the sub-programmes.

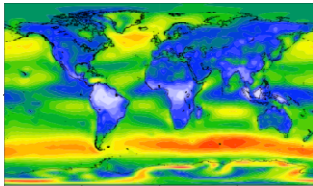
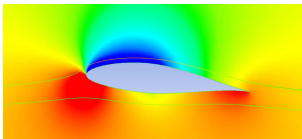
Participants Name	Country	Scientists	PostDocs, PhDs and visiting scientists	Technical administrative staff
Risø DTU	DK	70	28	21
ECN	NL	60	4	20
CRES	HE	14	5	7
CENER	ES	57	3	25
CIEMAT	ES			
FhG IWES	DE	70	15	15
LNEG/INETI	PT	22	12	6
UoP	PT	23	5	17
SINTEF	NO	35	25	
VTT	FI	35	1	10
UoS	UK	25	50	5

Partners' human resources in man-years available primo 2010 with a potential for alignment in the joint programme

Participants Name	Country	Human Resources (man-years)
Risø DTU	DK	24
ECN	NL	13
CRES	HE	10
CENER	ES	15
CIEMAT	ES	3
FhG IWES	DE	19
LNEG/INETI	PT	16
UoP	PT	3
SINTEF	NO	10
VTT	FI	6
UoS	UK	5,5

Estimate of human resources in the 5 sub-programmes for the first year

# Sub Programmes


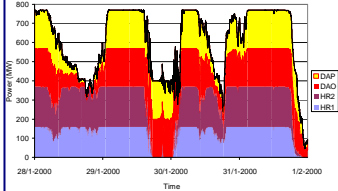
Sub-programme	Activity	Outcomes/results	Commitment
<p>Wind Conditions</p> 	<p>Improve wind modelling for siting and design</p> <p>Experimental basis for uncertainty assessment</p> <p>Atm. turbulence and wind turbine interaction</p> <p>Research basis for New European Wind Atlas</p>	<p>Reduce risk for wind projects by reducing uncertainty in the determination of energy output and the design of the wind turbines</p>	<p>SP leader: Risø DTU</p> <p>No. of participants: 8</p> <p>No. of countries: 7</p> <p>Commitment: 35 my/y</p>
<p>Aerodynamics</p> 	<p>Improved eng. inflow wind field modelling</p> <p>Improved aerodynamic design modelling</p> <p>Improved wake models</p> <p>Aero-hydro-elastic modelling</p> <p>New aerodynamic concepts and features</p>	<p>Scientific foundation for the industrial development of more cost effective wind energy and reduce the uncertainty in aero-elastic calculations of future large wind turbines and innovations</p>	<p>SP leader: ECN</p> <p>No. of participants: 6</p> <p>No. of countries: 6</p> <p>Commitment: 23 my/y</p>

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4 June 2010, Madrid




# Sub Programmes

Sub-programme	Activity	Outcomes/results	Commitment
<b>Offshore wind energy</b> 	Integrated numerical design tools for large deep offshore WTs Characterization of wind, wave and current cond. Tools for offshore grid and WF electric design, Predictive tools for O&M New concepts for deep sea	Scientific foundation for the industrial development of more cost effective offshore wind farms and enabling large scale deployment at sea	SP leader: Sintef Energy Research No. of participants: 9 No. of countries: 9 Commitment: 23 my/y
<b>Wind Energy Integration</b> 	Wind power plant capabilities Grid planning and operation Wind energy and power management	Scientific foundation for Migration of the electrical supply system to allow large scale deployment of wind energy and enabling WF plants to be managed as an integral part of the electricity system	SP leader: Fh IWES No. of participants: 7 No. of countries: 7 Commitment: 31 my/y

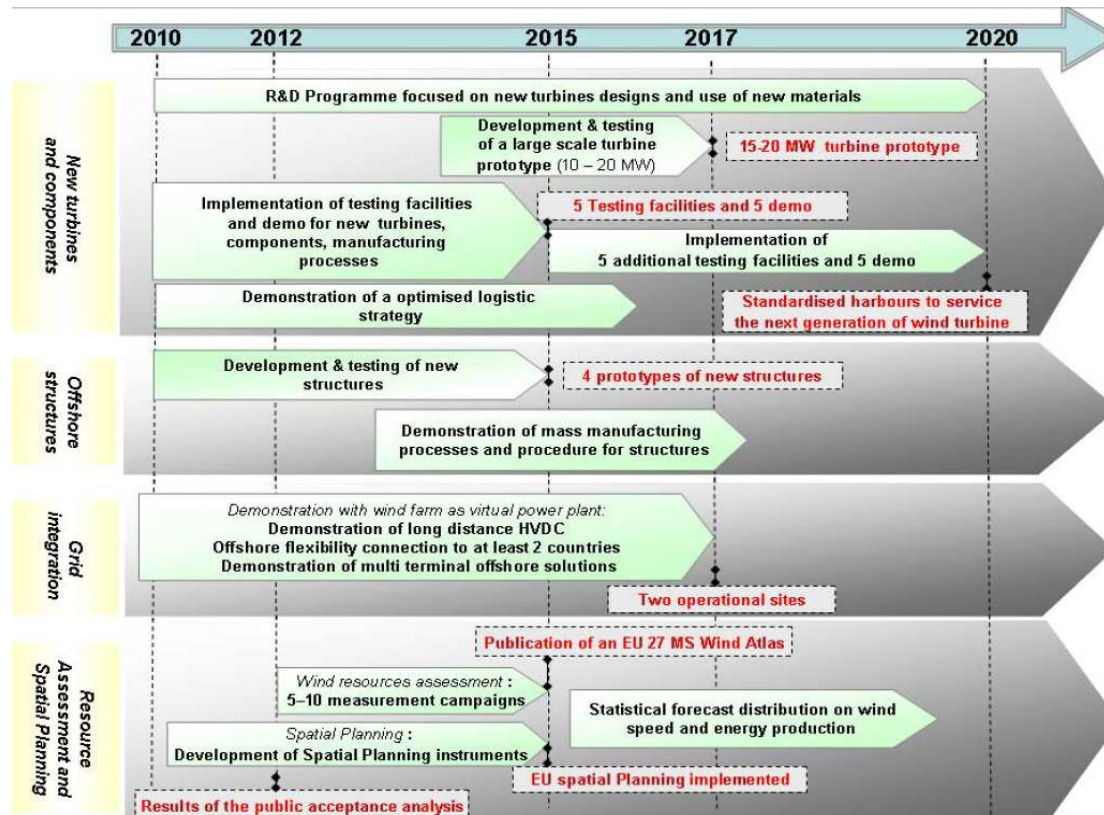
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# Sub Programmes

Sub-programme	Activity	Outcomes/results	Commitment
<p>Research facilities / infrastructure</p> 	<p>Inventory of EERA research facilities List the necessary research facilities/ Data base of exp. research projects Modes of use of partner's facilities New joint research facility projects.</p>	<p>Agreements for access to the research facilities, identification of needs, new joint facilities and contributions to the development of new joint research activities</p>	<p>SP leader: CENER No. of participants: 9 No. of countries:8 Commitment: 5,3 my/y</p>

# Relations with the EIs



Common basis for European Wind Industrial Initiative and EERA Joint Programme on Wind Energy:

- TPWind: Strategic Research Agenda

- EC: Wind Energy Technology Roadmap

## Relations with the EIs

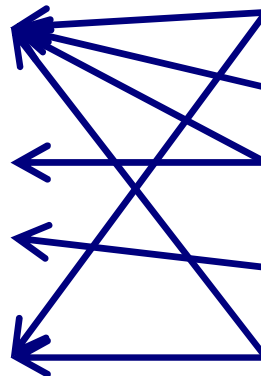
### European Wind Industrial Initiative

- Industry driven
- Special focus on development, test & demonstration

### EERA Joint Programme on Wind Energy

- Research community driven
- Special focus on medium to long-term research and research facilities

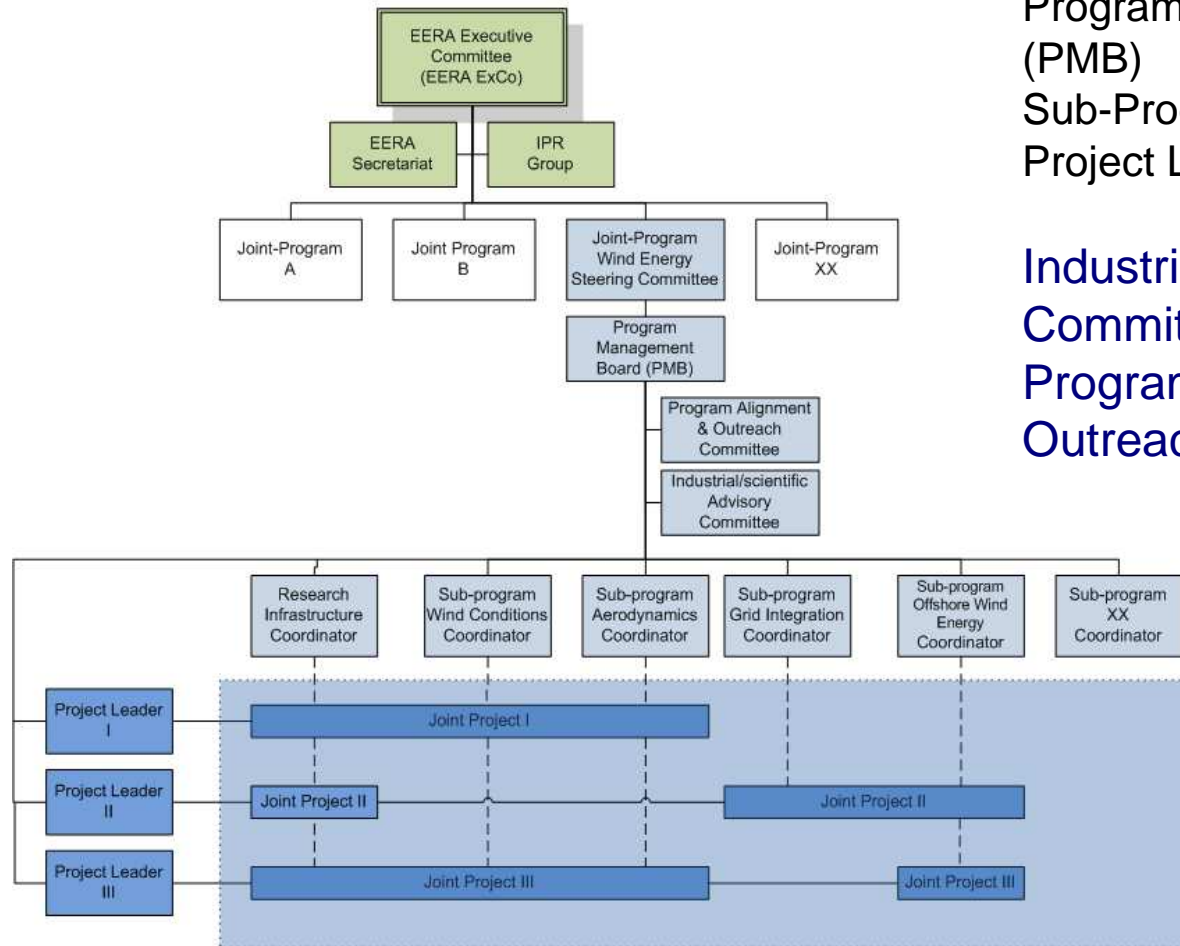
- New turbines and components;
- Offshore technology;
- Grid Integration;
- Resource assessment and spatial planning.



- Wind Conditions
- Aerodynamics
- Offshore Wind Energy
- Grid Integration
- Research Facilities

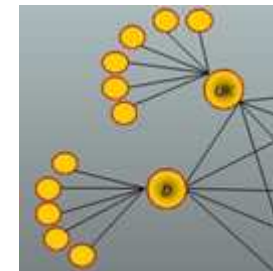
# Governance & Coordination

Management Structure of EERA Wind Energy Joint Program



Executive Committee (ExCo)  
Steering Committee (SC)  
Programme Management Board (PMB)  
Sub-Programme Coordinator (SPC)  
Project Leader (PL)

Industrial/scientific Advisory Committee  
Programme Alignment & Outreach Committee

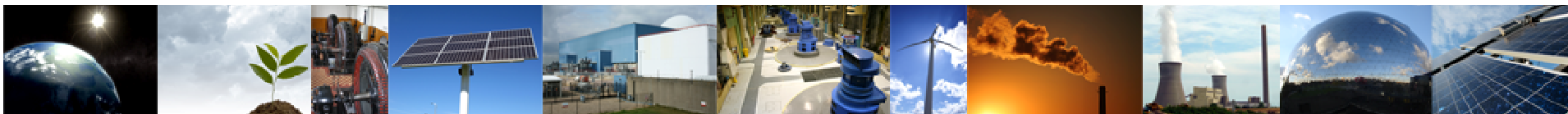


# Important Upcoming Activities

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- June 3-4: SET Plan event in Madrid
- September: Kick-off meeting & agreements with participants
- Scientific workshops: surveys of research activities, competences and facilities
- Experience developed by aligning existing research with national funding
- White paper on the European Handbook for Integrated Spatial Planning of Renewable Energy Resources: Part I, Wind Energy Resources
- Establish communication with the EC and national research programmes and with wind EII
- Medium-to-long-term research strategy formulated on wind energy
- Develop new major research initiatives to be submitted to EU and national research programmes for funding
- Detailed scientific programme 2011-2014 formulated and launched





**THANK YOU FOR YOUR ATTENTION**

***JP on Wind Energy***

**4 June 2010, Madrid**